

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte SHUI T. LAI

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Appeal No. 98-2187  
Application 08/051,033<sup>1</sup>

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ON BRIEF

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Before CALVERT, FRANKFORT and BAHR, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's rejection of claims 62 and 64 through 98, which are all of the claims remaining in the application. Claims 1 through 61 and 63 have been canceled.

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<sup>1</sup> Application for patent filed April 20, 1993.

Appeal No. 98-2187  
Application 08/051,033

Appellant's invention relates to a method of providing controlled ablation of organic material, particularly, ablation of eye tissue, with a laser by 1) generating laser pulses having an energy density of less than  $5FJ/(10Fm)^2$  and a duration in a range of about 0.01 picoseconds to less than 1 picosecond; and 2) applying said laser pulses to ablate the organic material. Independent claim 62 is representative of the subject matter on appeal and a copy of that claim may be found in Appendix A of appellant's brief.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

L'Esperance, Jr. (L'Esperance) 1985	4,538,608	Sep. 3,
Baron 1987	4,712,543	Dec. 15,
Menger 1988	4,791,927	Dec. 20,
Bille et al. (Bille) 1990	4,907,586	Mar. 13,
Lin 1992	5,144,630	Sep. 1,

Claims 62, 64 through 67, 70 through 77, 79, 80, 84 through 93 and 95 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lin in view of Bille.

Appeal No. 98-2187  
Application 08/051,033

Claim 68 stands rejected under 35 U.S.C. § 103 as being unpatentable over Lin and Bille as applied to claim 62 above, and further in view of Menger.

Claims 78, 81 through 83 and 94 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lin and Bille as applied above, and further in view of L'Esperance.

Claims 96 through 98 stand rejected under 35 U.S.C. § 103 as being unpatentable over Lin and Bille as applied above, and further in view of Baron.

Claim 69 stands rejected under 35 U.S.C. § 103 as being unpatentable over Lin and Bille as applied above, and further in view of Menger.<sup>2</sup>

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<sup>2</sup> Given that claim 69 depends from claim 98, we understand this rejection to be more correctly based on Lin, Bille and Baron as applied to claim 98, further in view of Menger.

Appeal No. 98-2187  
Application 08/051,033

Rather than reiterate the examiner's full statement of the above-noted rejections and the conflicting viewpoints advanced by the examiner and appellant regarding those rejections, we make reference to the examiner's answer (Paper No. 25, mailed November 10, 1997) for the examiner's complete reasoning in support of the rejections, and to appellant's brief (Paper No. 24, filed June 23, 1997) for appellant's arguments thereagainst.

#### OPINION

In reaching our decision in this appeal, we have given careful consideration to appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by appellant and the examiner. As a consequence of our review we have reached the determinations which follow.

Looking first to the examiner's rejection of appealed claims 62, 64 through 67, 70 through 77, 79, 80, 84 through 93 and 95 under 35 U.S.C. § 103 as being unpatentable over Lin in

view of Bille, we note that while Lin (col. 7, lines 39-48) discloses laser pulses used in optical microsurgery that are less than 1 picosecond (i.e., of subpicosecond duration), and Bille teaches laser pulses of "approximately one (1) picosecond" (col. 4, lines 57-58), neither of these references teaches or fairly suggests ablation of organic material (e.g., ablation of eye tissue) with a laser by generating laser pulses having an energy density of less than  $5\text{FJ}/(10\text{Fm})^2$  and a duration in a range of about 0.01 picoseconds to less than 1 picosecond. In our opinion, the examiner's finding (answer, pages 3-4) with regard to Bille's teaching of ablation of tissue, ablation of eye tissue and the use of power densities in the ranges claimed, is in error. As for Lin, this reference expressly notes that for short pulses in the range of subpicosecond to a few picoseconds in duration, and high repetition, "very high beam densities can be achieved" (col. 7, lines 44-45).

Like appellant (brief, page 6), we have determined that Bille, at least generally, teaches energy densities that are higher than the " $5\text{FJ}/(10\text{Fm})^2$ " set forth in

appellant's independent claims 62, 79 and 90 on appeal. As for the examiner's calculations on page 6 of the answer, which the examiner purports show energy densities in the claimed range, we note that such calculations have not accounted for the effects of the wavelength variation indicated in column 9, lines 17-21, of Bille and have entirely disregarded the duration of the pulses that would be necessary to actually cause ablation of tissue in a focal spot that is 70 microns in diameter (see, for example, Bille, Col. 7, lines 13-17). In our opinion, a laser pulse applied to a 70 micron diameter focal spot at an energy density of  $0.2599 \text{ FJ}/100 \text{ Fm}^2$  (as calculated by the examiner) and for a duration of less than 1 picosecond would not cause ablation of organic material, but would require a much longer pulse duration to cause ablation, if at all. Likewise, the examiner has not convinced us that the calculated energy density of  $0.2 \text{ FJ}/100 \text{ Fm}^2$  applied for a duration of less than 1 picosecond would be capable of being useful for tissue ablation, as is required in each of the claims before us on appeal.

Thus, after considering the combined teachings of the applied references, it is our determination that the examiner has not established a *prima facie* case of obviousness with regard to appellant's claimed methods of providing controlled ablation of organic material (claim 62), eye tissue (claim 79), or, more specifically, cornea tissue (claim 90). For that reason, we will not sustain the examiner's rejection of claims 62, 64 through 67, 70 through 77, 79, 80, 84 through 93 and 95 under 35 U.S.C. § 103 as being unpatentable over Lin in view of Bille.

With regard to the examiner's other rejections on appeal, we have reviewed the teachings of L'Esperance, Baron and Menger relied upon by the examiner, but find nothing therein which alters our view with regard to the basic combination of Lin and Bille. Therefore, the examiner's rejections of dependent claims 68, 69, 78, 81 through 83, 94 and 96 through 98 will likewise not be sustained.

Appeal No. 98-2187  
Application 08/051,033

As is apparent from the foregoing, the decision of the examiner rejecting claims 62 and 64 through 98 of the present application is reversed.

REVERSED

IAN A. CALVERT	)	
Administrative Patent Judge	)	
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CHARLES E. FRANKFORT	)	BOARD OF PATENT
Administrative Patent Judge	)	
	)	APPEALS AND
	)	
	)	INTERFERENCES
	)	
JENNIFER BAHR	)	
Administrative Patent Judge	)	



Appeal No. 98-2187  
Application 08/051,033

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